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The Parallel Air Tasking Order: Reducing the Size of the Air Operations Center

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Abstract

The current size of the Air Operations Center (AOC) is too large for rapid deployment and flexible employment. Its size is a reflection of the processes therein. To reduce the size of the AOC, we must change the process for building and executing the Air Tasking Order (ATO) from a serial process to a parallel one.

The approach to this issue is a description and comparison of serial and parallel ATO processes and AOC structures. The conclusion shows the necessary footprint in terms of personnel required for both baseline and objective processes and potential deployment options for the parallel ATO producing AOC.

Introduction

Improvements to the AOC and its processes since Operation Allied Force (OAF) are notable but also incremental because the serial production process has not changed. Even with better tools the ATO production cycle has only marginally improved. Making a serial process go slightly faster by incrementally improving the individual steps is less efficient than making those steps operate in parallel.

The impact on command and control (C2) is obvious. To function successfully a parallel ATO must be based on anticipatory analysis and effects based operations (EBO). The perception that arose during OAF was that "…the air planning process more closely resembled a 'servicing of target lists' than an 'effects based targeting campaign for systematically attacking target sets and centers of gravity."[1] The parallel ATO construct creates a more modular production process, enhancing flexibility and making it easier to add new capabilities. Establishing this construct facilitates oncoming improvements in precision engagement. Further, it reduces the time and labor to produce and manage the same amount of battlespace effects. Most important of all, with a more modular production process the deployment of the AOC becomes more flexible thereby reducing its size.

Two key areas described in the parallel ATO process include Predictive Battlespace Awareness (PBA) and target queuing. PBA encompasses three elements: the methodology of Intelligence Preparation of the Battlespace (IPB); intelligence, surveillance and reconnaissance (ISR) planning and strategy; and ISR execution management. PBA is intended to drive ISR toward a more proactive, anticipatory mode of operations rather than a reactive, discovery mode. The Air Force realized following OAF that training through the 1990s had focused more on tactics, techniques, and procedures than on results-based evaluation and implementation of courses of action at the strategic and particularly operational levels. While this was driven by the complexity of modern air campaigns the Air Force also understood following OAF that this balance must shift.[2]

Target queuing is the means by which attack planning passes and modulates tasking to strike assets. It links targets to kinetic and non-kinetic capabilities of the joint

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[1] Headquarters United States Air Force, Initial Report, *The Air War Over Serbia: Aerospace Power in Operation Allied Force*, April 25, 2000, page 38.
[2] Ibid., page 38.

air component. More broadly it links PBA to EBO through a visualization of the resources[3] at each capability.

The results of this paper affect doctrine, training, and acquisition. It shows a means in which the technical and procedural methodology of the ATO process can be streamlined. This streamlining incorporates lessons learned from the military's most recent operations. The end state is a description of an ATO process that will require a far smaller AOC to execute.

Today's AOC and ATO Process

The Joint Force Air Component Commander (JFACC) conducts the air campaign from the AOC. While there some differences in AOCs established throughout theaters that have evolved to meet the coalition and theater requirements there is a basic structure of the AOC clearly defined in joint and Service doctrine.[4, 5] The basic structure of the AOC has five divisions:

(1) Strategy,
(2) Combat Plans,
(3) Combat Operations,
(4) Intelligence, Surveillance and Reconnaissance, and
(5) Air Mobility.

In Air Force doctrine the AOC is treated as a weapon system to enhance standardization and ensure improvements in training and technology are flexible throughout the Air Force. The Air Forces has been successful in maintaining a core cadre of trained personnel for each AOC and then rapidly augmenting that force.[6]

A Joint AOC Director responsible to the JFACC leads the AOC. The Joint AOC Director actually runs the daily operations of the AOC and is responsible for the overall integration of the many activities of the AOC. For the various information flows throughout the AOC and beyond these information flows must be integrated vertically and horizontally. Much of this integration relies on liaison personnel due to poor machine-to-machine integration and organizational integration, i.e., collaboration.

While there are variations among theater AOCs, often due to coalition constraints, there are common to all AOCs the Combat Plans Division and Combat Operations Division. This paper focuses primarily on these two divisions with additional relevant discussion of the ISR Division. Near term planning and development of the ATO is the responsibility of the Combat Plans Division. The execution of the ATO both offensively and defensively is the responsibility of the Combat Operations Division.

In addition to the five divisions of the AOC there are numerous liaison elements attached to the AOC for better cross-organizational integration. These include but are not limited to:

- Naval Amphibious Liaison Element (NALE),

[3] This could be weapons, sortie rates, time required, latency and others.
[4] Joint Publication 3-30, *Command and Control for Joint Air Operations*, 5 June 2003, page II-5.
[5] Air Force Instruction 13-1AOC, Volume 3, Operational Procedures—Aerospace Operations Center, 1 July 2002, pages 10-17.
[6] U.S. Central Command Air Forces (USCENTAF), Assessment and Analysis Division, *Operation IRAQI FREEDOM—By The Numbers*, 30 April 2003, page 3.

- Battlefield Coordination Detachment (BCD),
- Special Operations Liaison Element (SOLE),
- Marine Liaison Element (MARLO), and
- Army Air and Missile Defense Command (AAMDC).

Also, depending on the plan or contingency supported the AOC may have liaisons from international and national organizations such as the United Nations High Commission for Refugees, Red Cross or the Department of State.

The Combat Plans Division is divided into four teams:

- Joint Guidance Apportionment and Targeting (JGAT)[7] Team,
- Master Air Attack Plan (MAAP) Team,
- ATO Production Team, and
- C2 Planning Team.

The JGAT Team develops the air component target nominations and integrates them with other component target nominations to develop the draft JIPTL. The JGAT Team also develops the Joint Integrated Prioritized Collection List (JIPCL). The JIPCL is not an approved joint term but is used in Air Force doctrine to describe a document that captures cross-component collection requirements for daily tasking. The JIPCL's development runs in parallel with the JIPTL and reflects ISR collection strategy and planning in support of combat operations.

The JGAT Team transfers its products to the MAAP Team who match air, space and information operations capabilities with the potential effects determined by targeteers to best achieve the commander's guidance, objectives and intent. The final product of this effort is the MAAP.

The MAAP is passed to the ATO Production Team who builds the ATO with the appropriate theater battle management system applications. The ATO Production must also develop and coordinate any special instructions associated with the ATO.

Lastly, the C2 Planning Team develops execution plans for C2. Key planning functions include C2 architecture, air defense, and C2 communications. These functions include the deconfliction of communications used by friendly C2 assets from those used by the adversary that will be jammed by electronic warfare assets. During OAF NATO planners were frustrated by the challenges of integrating the various information operations capabilities such as electronic warfare into a coherent strategy that supported the air campaign.[8]

The Combat Operations Division is divided into offensive and defensive organizations to monitor the execution of the ATO. As in the Combat Plans Division where functional experts make key inputs, i.e., pilots familiar with the aircraft employed, manage the execution of the ATO.

The most challenging function of the Combat Operations Division is time sensitive targeting (TST). TSTs are "those targets requiring immediate response because they pose (or will soon pose) a danger to friendly forces or are highly lucrative fleeting

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[7] Referred to as the GAT in Air Force Instruction 13-1AOC, but Joint GAT, or simply JGAT, in Joint Publication 3-30.

[8] Headquarters United States Air Force, Initial Report, *The Air War Over Serbia: Aerospace Power in Operation Allied Force*, April 25, 2000, page 41.

targets of opportunity."[9] The TST process is expedited where time is the primary constraint. There are other targets that may become available during the ATO execution that are sensitive in nature for a variety of reasons but the processing of tasking for those targets does not require expediting by the Combat Operations Division.

Establishing the guidance and procedures for prosecuting a TST ahead of time are vital to success. Also, some scheme for management of assets for ISR (i.e., combat assessment) and attack must be established. This can include dedicated alert aircraft, both airborne and ground, scheduled missions that have not launched, and diverting airborne aircraft. The ISR aspects of TST are greatly facilitated by the visualization tools associated with PBA.

The JFACC uses the joint air tasking cycle as the overarching process to produce and manage the air tasking for an air campaign. It is a repetitive process that, once air operations have begun, has some events, i.e., strategy, planning, production, execution, and assessment, occurring continuously and in parallel. However, the concept of parallel air tasking orders takes this a step further by combining those activities that prepare plans directly applied to ATO production with the actual tasks of ATO execution.

The joint air tasking cycle has six phases:

(1) JFC and Component Coordination,
(2) Target Development,
(3) Weaponeering and Allocation,
(4) ATO Production,
(5) Force Execution, and
(6) Combat Assessment.

The ATO cycle is closely tied to the joint targeting cycle. The air tasking cycle focuses air and space resources on targeting efforts; as such it supports operational requirements. In fact, a discussion of the targeting cycle in conjunction with the air tasking cycle is given in Joint Publication 3-30, *Command and Control for Joint Air Operations*.[10] The air tasking cycle provides systematic, rigorous procedures that are straightforward in training and execution for what is otherwise an extremely complex process.

The ATO that results from this process typically represents a 24-hour block of time. Both joint and Air Force doctrine are flexible in the specific period of time covered by the ATO. However, Operations Desert Storm, Northern Watch, Southern Watch, Allied Force, Enduring Freedom, Iraqi Freedom and even during exercises it is considered the norm to default to a 24-hour block of time for each ATO. It is a considerable effort to produce a single document anticipating every air operation during a single day and as such the production begins days in advance with the development of the Air Estimate and the Joint Air Operations Plan (JAOP). In fact there are ultimately multiple ATOs in various stages of "production" at the same time:

(1) The ATO in planning,
(2) The ATO in execution, and

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[9] Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms*, 12 April 2001 (As Amended Through 5 September 2003), page 538.
[10] Joint Publication 3-30, *Command and Control for Joint Air Operations*, 5 June 2003, pages III-16 – III-19.

(3) The ATO in assessment. [11, 12]

In this context then we see the full ATO cycle starting from JFC guidance to the end of execution as a 72-hour period of time. Due to the global nature of air operations it is possible for aircraft to be airborne well before the ATO is in execution. This obviously includes inter-theater airlift but also includes missions launched from outside the theater.

The ATO matches targets, or in the case of kinetic weapons, desired mean points of impact (DMPI), with the capabilities of the forces available to the JFACC. Other component air assets that appear on the ATO are not necessarily under the control of the JFACC but are included for battlespace awareness.

The initial phase of the air tasking cycle, JFC and Component Coordination, starts with the JFC's objectives, guidance and intentions. After operations have commenced these will be continuously refined at the operational level of the AOC by the Strategy Division to provide a JFACC-specific implementation of the broader JFC guidance. JFC guidance drives the targeting process by providing criteria for prioritization.

Air apportionment is also part of the guidance and objectives. Increasingly the use of mission specific aircraft such as the A-10 Thunderbolt are giving way to multi-role aircraft. Further, aircraft conceived as strategic assets such as the B-52 Stratofortress and the B-1 Lancer can with precision guided munitions be used as close air support platforms like the A-10. Thus, methods for apportionment such as percentages, sorties or priorities against mission-type are less relevant today particularly after experiences in OEF and OIF.

The second phase of the air tasking cycle is target development. In this phase targeting analysts integrate their efforts with operations. This is done through coordinating entities such as the Joint Guidance, Apportionment and Targeting (JGAT) Team. The JGAT Team brings together all target nominations from the components and other organizations at the theater and national levels, recommends prioritization and, once approved by the JFACC, produces the Joint Integrated Prioritized Target List (JIPTL). The JIPTL typically has a "cut line" associated with it. This line indicates roughly how many targets JFACC assets can service within the 24 hours of that ATO. As the ATO is executed the situation can change bumping lower priority targets up above the line. Furthermore, targets that were higher in priority two days previously can drop in priority by the time the ATO is in execution. It is a normal part of ATO execution management to make these adjustments to the ATO in execution and its associated JIPTL during combat operations. During OAF, Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) our forces become more capable of this type of flexibility in air operation. Flex targeting as it became known involves launching aircraft without targets specifically assigned and providing them with targets while en route.

The third phase of the ATO cycle matches capabilities against the targets in the JIPTL. The Weaponeering and Force Allocation phase includes lethal and non-lethal capabilities. It is vital to remember that "…targeting personnel quantify the expected results of lethal and non-lethal weapons employment against prioritized targets to

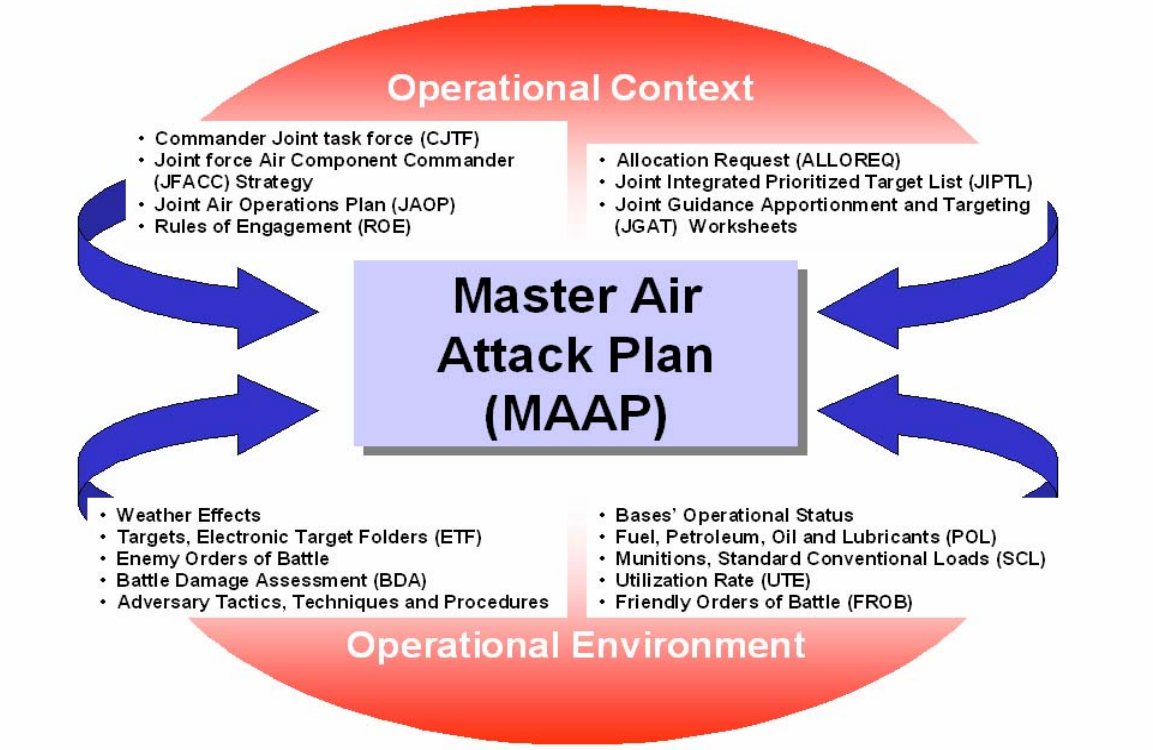
[11] Ibid., pages III-19 – III-20.

[12] Air Force Instruction 13-1AOC, Volume 3, Operational Procedures—Aerospace Operations Center, 1 July 2002, pages 14-17.

produce ***desired effects***."[13] It is in this phase that targeteers match an estimated effect with a target so that assessment of those effects can take place in the sixth phase: combat assessment.

Efforts are underway to develop methods for capabilities that are harder to quantify or assess. For example, information operations include the effects of a leaflet drop, a computer network operation, or the jamming of a radar site. While it is difficult to assess these with immediate primary effects it is possible to see secondary effects and thus the probability of effect that a targeteer would associate with a given capability in this phase can be assessed later.

Once the targeteers have matched force capabilities against the JIPTL it can be passed to the MAAP Team. The MAAP Team selects from the capabilities presented to them by the JGAT Team and determines the best timing for those effects to occur. This is normally done with a graphical depiction of the battlespace including threats, targets, and available capabilities **(See Figure 1: Master Air Attack Plan)**.[14] The resulting plan is the basis for ATO production in the next phase.



Per Joint Publication 3-30, *Command and Control for Joint Air Operations*, Figure III-14

Figure 1: Master Air Attack Plan

AOC personnel in the Combat Plans Division use the various plans, particularly the MAAP, directions, instructions, briefings, worksheets and component requirements developed during the previous phases to assemble the ATO. The data from multiple

[13] Joint Publication 3-30, *Command and Control for Joint Air Operations*, 5 June 2003, page III-22, emphasis added.

[14] Tools available within the Predictive Battlespace Awareness (PBA) concept under development will soon present this type of visualization of capabilities and targets. PBA is discussed later in this paper.

worksheets are entered ***by hand*** via the Theater Battle Management Core Systems (TBMCS) applications. ***To increase the speed of the air tasking cycle it is necessary to minimize the number of keystrokes or other manual tasks, particularly the reformatting of data from one system or database or report to another. In short, the volume of data per data entry operation must increase.***

The ATO must include a variety of instructions that reflect the constraints of the politics, the laws of armed conflict, and of course air space control. These instructions resulting from a complex battlespace environment are by necessity very detailed. Instructions contained in the special instructions (SPINS) of the ATO and the airspace control order (ACO) are updated as often as required and not by the constraints of a 24 hour clock.[15]

The management of the execution of the ATO occurs during the fifth phase of the air tasking cycle. The AOC is the central agency with the authority to revise the ATO during its execution.[16] Force Execution requires the AOC to be responsive to the changes in the ATO. This was notable during OEF when TST sometimes required many hours to resolve usually do to collateral damage constraints and requirements for positive identification.[17] This was also of concern during OAF when the process of TST approval and ATO management was further complicated by separate U.S. and NATO air tasking orders.[18]

The final phase of the air tasking cycle is Combat Assessment. As indicated during the Weaponeering and Force Allocation phase, the desired effects of various force capabilities against their targets are assessed in this phase. There are two major challenges to combat assessment. First, many effects that are achievable do not have a detectable signature such as in information operations. In these cases assessment analysts are forced to search for secondary signatures. For example, computer network operations taken against an adversary's C2 node will not necessarily show a discernible effect. However, the delay in movement or apparent lack of coordination in the adversary's forces indicates the operation has had its desired effect. The results of this phase refine the strategy developed by the JFC in coordination with the component commanders.

PBA and Target Queuing

There are two key concepts in the parallel ATO process: PBA and target queuing. PBA is the state of awareness achieved and maintained by the commander allowing him to correctly anticipate future conditions and better focus high value/low density ISR assets. It is a continuous process providing visualization, intelligence analysis, exploitation, collaboration, and operational wargaming. PBA is intended to drive ISR toward a more proactive, anticipatory mode of operations rather than a reactive, discovery mode. The goal of PBA is to achieve an unparalleled degree of battlespace

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[15] Joint Publication 3-30, *Command and Control for Joint Air Operations*, 5 June 2003, page III-24.
[16] Ibid., page III-25.
[17] Headquarters, Air Force, Task Force Enduring Look (AF/CVAX), *Operation Enduring Freedom Preliminary Lessons AWC Brief*, briefing, 6 Nov 02.
[18] Headquarters United States Air Force, *The Air War Over Serbia: Aerospace Power in Operation Allied Force*, Initial Report, Apr 25, 2000, page 22.

cognizance such that the commander can drive the adversary to the course of action (COA) selected by the commander.

PBA encompasses three elements: the methodology of IPB; ISR planning and strategy; and ISR execution management. PBA is defined in doctrine in the Air Force pamphlet *Aerospace Intelligence Preparation of the Battlespace*.[19] IPB is well defined in joint and Service doctrine but PBA is a more recent concept. As such, it's terminology and elements are evolving. Current descriptions include *four* elements:

(1) IPB,
(2) ISR Planning and Strategy,
(3) ISR Execution, and
(4) Assessment.

Assessment further refines the construct by assessing the effects of combat operations. Assessment also includes the internal performance metrics and analysis of the AOC, i.e., how well intelligence and operations function together in an integrated C2 system.

The first element of PBA, IPB, narrows the focus on the battlespace to specific areas for limited surveillance and reconnaissance resources. Because the battlespace is highly dynamic the ISR execution management has to be tightly integrated and easy to reassign tasks. Further, the emphasis on the flexibility of ISR assets extends beyond the battlespace where control of some surveillance and reconnaissance assets are located at the national level intelligence analysis and production centers.

The description of IPB follows the same basic four steps in PBA as it does in joint and Service doctrine:

(1) Define the battlespace
(2) Describe the battlespace's effects
(3) Evaluate the adversary, and
(4) Determine the adversary's courses of action.

The IPB process is continuous and normally begins well before the air campaign when considered at the operational level. Once operations planning have begun, the ISR strategy is developed along with the initial steps of IPB. Thus the first three steps of IPB are executed with ISR strategy and planning. Products from IPB benefit the development of an ISR strategy and ISR plans. Furthermore, planning for the combat assessment that follows combat operations also begins early in the PBA process because target analysts must ensure that the appropriate ISR assets are available to discern the likely effects of planned operations.

Target queuing is the means by which attack planning passes and modulates tasking to strike assets. Queuing systems or models are analytical tools used to describe or assess the performance of a system such as a telecommunications network, a fast food restaurant, or the production throughput of a factory. In queuing models there are queues, servers and customers. Applying this idea to our AOC we see that the customers are targets, the servers are the various teams in the Combat Plans Division, and the queue is the steady stream of targets fed to the MAAP Team by the JGAT Team (the JIPTL). By extending the model to include EBO we see that the various kinetic and non-kinetic capabilities executing the ATO are also servers **(See Figure 2: AOC Queuing Model)**.

[19] Air Force Pamphlet 14-118, *Aerospace Preparation of the Battlespace*, 5 June 2001, pages 6-7.

Parallel Air Tasking

The AOC can be thought of as a factory producing ATOs. To optimize production flow involves reducing process time per workstation. In our AOC we can imagine the major elements of the ATO cycle as workstations in an ATO factory, i.e., the JGAT Team is a workstation that takes candidate targets as input from components and transforms them into the JIPTL. The JIPTL is passed to the next workstation on the "factory floor," the MAAP Team, to produce the MAAP, i.e., the ATO shell and its associated ATO worksheets. The next workstation on the line is the ATO Production Team who takes the MAAP and ATO worksheets and produces the ATO.

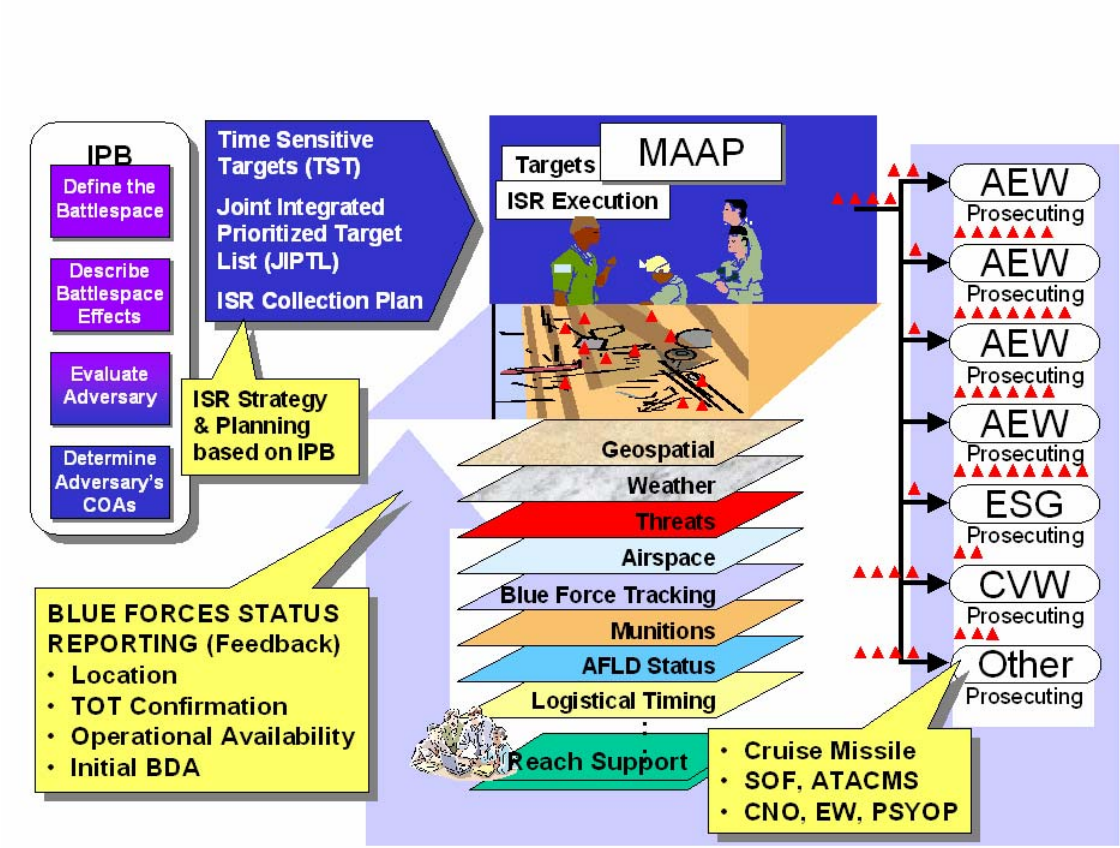

Figure 2: AOC Queuing Model

There are two ways to optimize this flow that are relevant to the AOCs of today. First, we can parcel the battlespace and have multiple AOCs producing 24-hour ATOs in parallel. In short, multiple parallel production lines deconflicted spatially but coordinated temporally. The second option is to go to the lowest component level of production, that is the target,[20] and task capabilities against those targets without regard to an arbitrary 24-hour block of time but instead treat time as a component of execution. In other words, the target is linked to a servicing capability such as an air expeditionary wing (AEW) or

[20] Specifically we mean the *point of effect.* This could be a DMPI for a kinetic effect or it could be some other vulnerability attacked by non-kinetic means, e.g., leaflets or computer network operations. The term point of effect should not be confused with the emerging term probability of effect (Pe), which may supplant the less applicable probability of damage (Pd).

carrier air wing (CVW) with recommended weapons and *time window* for execution. It is up to the tactical unit or capability to service that target within the time frame. The unit will identify the specific weapon used and time over target to the AOC. It is then a simple extension to link objectives, effects, targets, capabilities, timing and assessment **(See Figure 3: Parallel Air Tasking Orders)**.

The New Parallel Process

What is notable about the time involved in the new process is that it is not locked to a block of time based on the rotation of the Earth. If anything, the time component should be associated with the operational phases of the campaign such that given targets will be attacked (affected by various means) within a timeframe or by a discrete point in time. For parallel air tasking pre-campaign planning resulting from PBA provides the JFACC with a effects-based plan including targets, effects, and recommended capabilities

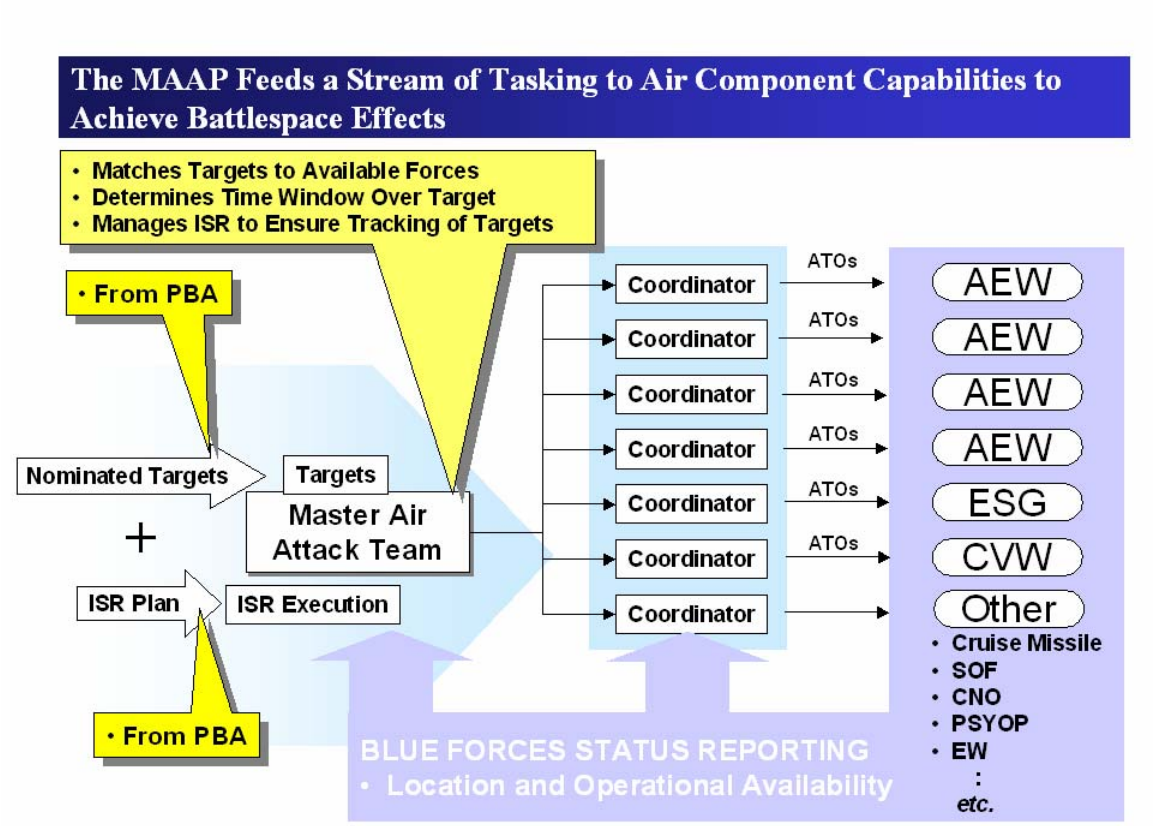

Figure 3: Parallel Air Tasking Orders

and phasing. At the point when targets from pre-campaign planning have been exhausted the parallel tasking process would ramp up from its management of TSTs.

Much of the ISR capabilities of the ISR Division can be satisfied by personnel "deployed in garrison." Thanks to the network-centric nature of PBA only a core cadre of analysts, targeteers and collection management experts need deploy forward with the AOC. In fact, much the same can be argued for the Strategy Division and the Air Mobility Division. However, as described above the organization that is built around

PBA and the parallel air tasking process is a synthesis of the JGAT and MAAP teams from the Combat Plans Division, and the TST Cell from the Combat Operations Division.

In a permissive air campaign, such as OEF or OIF, where the adversary's counter air assets (aircraft and surface-to-air missiles) are neutralized or are minimal, then many elements of the ATO can be pre-loaded such as air refueling orbits and assets, defensive counter-air patrols if there are remaining adversary air assets, and communications frequencies. Thus these and other elements of the ATO do not have to be locked into the 24-hour cycle. This added flexibility further contributes to the "modularizing" of the AOC that comes from a PBA environment supporting parallel air tasking.

For example, a rough comparison of personnel supporting the AOC and Air Force Forces (AFFOR) staffs during the past several air campaigns provides an interesting discussion point **(See Table 1: Rough Order Comparison of AOC Personnel and Sortie Rates)**.

Table 1: Rough Order Comparison of AOC Personnel and Sortie Rates[21, 22]

	Operation Iraqi Freedom	Operation Enduring Freedom	Operation Allied Force	Operation Desert Storm	Parallel Air Tasking
Personnel	1966	720	2467	2458	200
Approximate Sorties/Day	1380	500	800	2000+	1000
Personnel/Sortie	1.42	1.44	3.08	<1.23	0.20

The numbers for personnel represent peak values and there is no comparison in terms of when each AOC achieved that peak value. It also includes personnel from the AFFOR staff in addition to the AOC. The reason for this is that the AFFOR provide the support to the AOC weapon system as a component of the Theater Air Control System (TACS). Even if the JFACC was not an Air Force officer there would still be an AFFOR staff supporting the AOC.[23]

By dividing the approximate numbers of personnel by the sortie rate (approximate sorties per day) we arrive at a figure that indicates we have not made significant progress in the dozen years since Operation Desert Storm. The figure of 1,000 sorties per day represents a suggested threshold of capability for a major theater war. Ideally, we should set as a goal something far smaller in terms of the deployed personnel footprint as is shown in the rightmost column under the heading Parallel Air Tasking. **The current migration path for the AOC weapon system does not indicate we will get there soon.**

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[21] U.S. Central Command Air Forces (USCENTAF), Assessment and Analysis Division, *Operation IRAQI FREEDOM—By The Numbers*, 30 April 2003, page 3.

[22] Headquarters U.S. Air Force, Lt Gen Chuck Wald, HQ USAF/XO, Corona Top 02, *Enabling the PSAB CAOC Weapon System: Roadmap for the Future*, briefing, undated.

[23] Air Force Instruction 13-1AOC, Volume 3, Operational Procedures—Aerospace Operations Center, 1 July 2002, pages 7-8.

Summary

The results of this paper have implications affecting doctrine, training, and acquisition. For example the description of air tasking occurs in detail in multiple joint and service publications including

- *Joint Publication 3-30 Command and Control for Joint Air Operations,*
- *Joint Publication 3-60 Joint Doctrine for Targeting,* and
- *Joint Publication 2-01.1 Joint Tactics, Techniques, and Procedures for Intelligence Support to Targeting.*

Also the Air Force's instruction on AOCs *Air Force Instruction 13-1AOC, Volume 3, Operational Procedures—Aerospace Operations Center* would require updates for the new process.

A stronger coupling between targeting and air operations training would be valuable. Curricula for targeting, AOC core cadre associated with planning and execution, and air weapons would have to be revised at Service and joint schools.

Acquisition efforts are striving to bring the weapon system approach to the AOC such that it truly becomes integrated. With relatively small changes to the AOC's system architecture it is possible to change from a limited serial ATO production process to a parallel one. The implementation of a PBA Framework provides the predictive visualization required for target queuing and therefore a parallel air tasking system.

This parallel ATO process provides a means in which the technical and procedural methodology of the ATO process can be streamlined. The end state is an ATO process that requires a far smaller AOC to execute.

Reducing the Size of the AOC with Parallel Air Tasking

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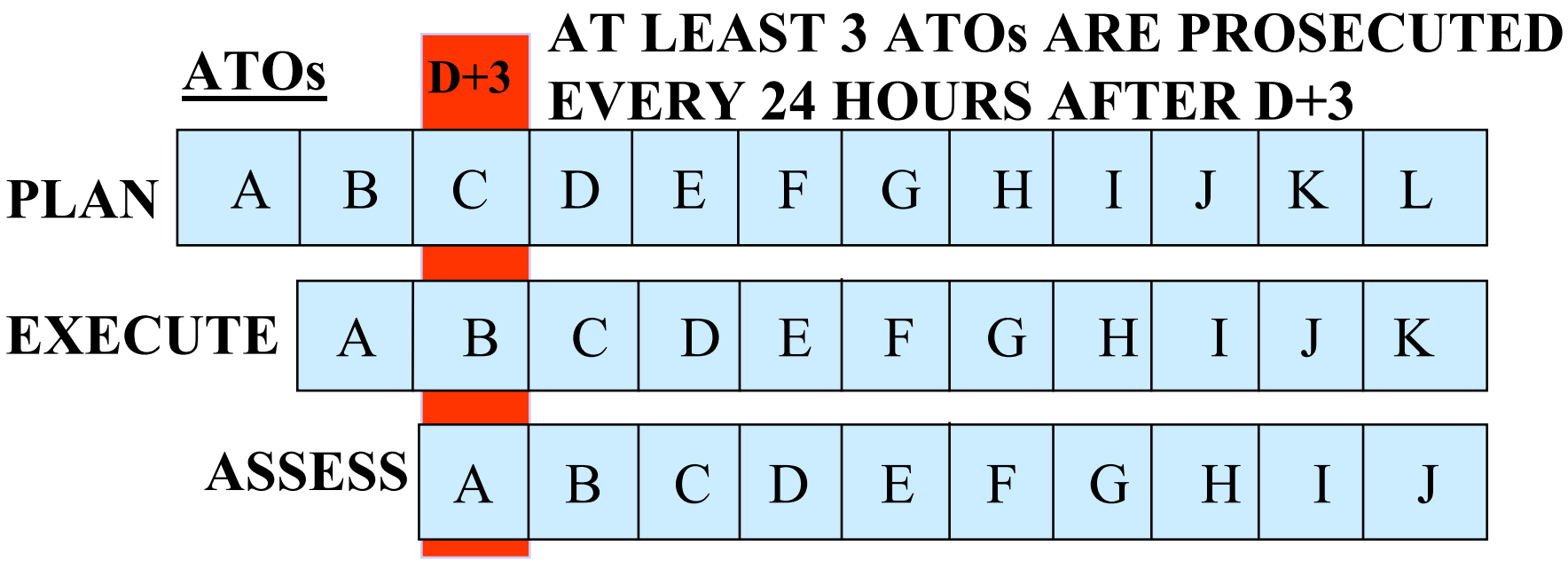
28 May 2004

Introduction

- AOC structure based on scope of mission and people required to work around an outdated *system (H/W, S/W & process)*
  - *Process is the root cause* – hardware and software problems are the symptoms
  - *Integration* is a contributing factor
- Parallel Air Tasking
  - Reduces each ATO to the smallest unit size convenient for execution
  - Multiple ATOs executed simultaneously
  - Not artificially time constrained
  - Time based on desired effects
  - Makes it easier to implement effects-based operations (EBO) and decompose the structure of the AOC

Today's ATO Production and Management is a Serial Process



Weak Points in Current ATO Production

- A single message covering as many expected events as possible in a given block of time (usually 24 hours)
  - **Negative Impact** on Content – the ATO covers a lot of information because it covers a large block of ***time***
  - **Negative Impact** on AOC ***Size*** – too many contractors, liaisons and “experts” to produce each ATO
- Improvements are merely incremental because the serial production process hasn’t changed
  - Even with better tools the production cycle will only ***marginally*** improve
  - Making the individual steps in a ***serial process*** go slightly faster is less improvement than making them operate in parallel
  - It’s time to change the production process

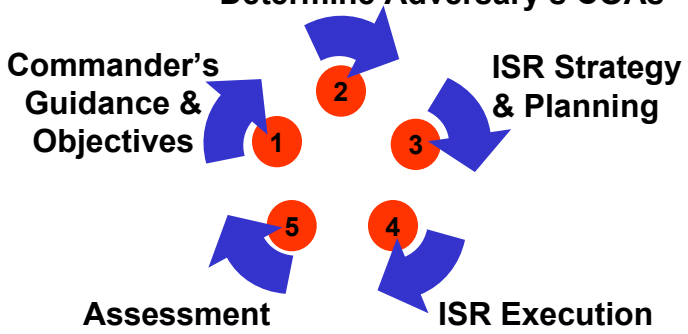
The Major Steps in the New Parallel Process

PBA

Defining Targets that Drive the Adversary to a Specific COA

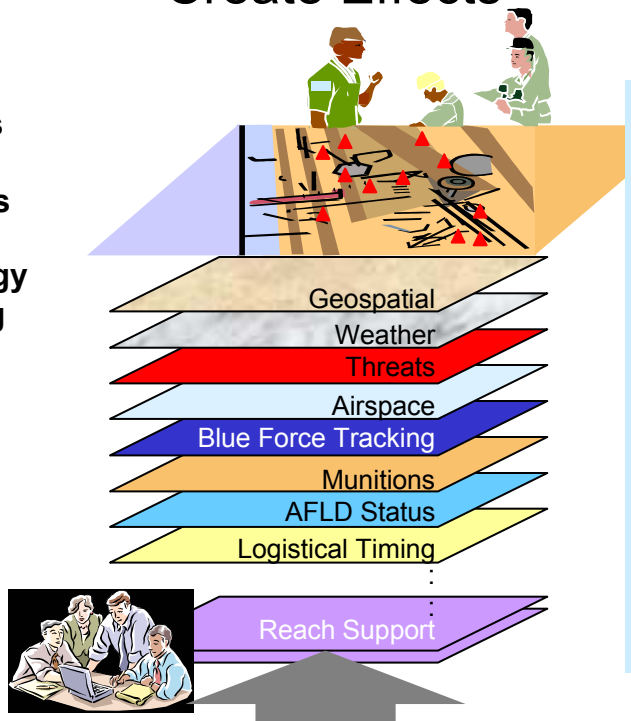
IPB

- **Define the Battlespace**
- **Describe Battlespace Effects**
- **Evaluate Adversary**
- **Determine Adversary's COAs**



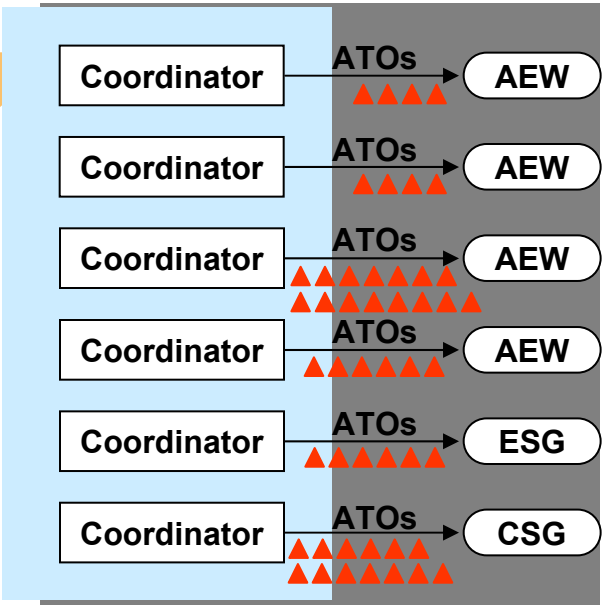
MAAP

Matching Targets to Capabilities to Create Effects



Queuing

Managing the Flow of Operations



BLUE FORCES STATUS REPORTING
Location and Operational Availability

Predictive Battlespace Awareness (PBA): Predictive ISR

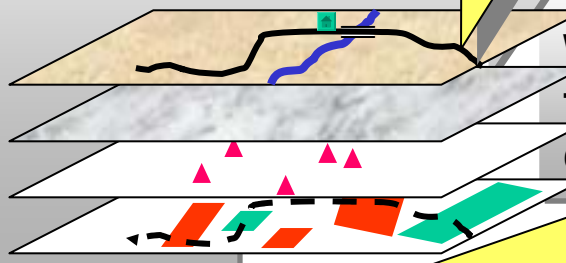
Intelligence Preparation of the Battlespace (IPB)

- Define the Battlespace
- Describe Battlespace Effects
- Evaluate Adversary
- Determine Adversary's COAs

Doctrine (behavior) *and* OB

Products of IPB are *Decision Aids*

Decision Aids



Geospatial
Weather
Targets
COA, NAI, TAI*

*COA – Course of Action
NAI – Named Area of Interest
TAI – Targeted Area of Interest

4 Elements of PBA
(1) IPB
(2) ISR Strategy & Planning
(3) ISR Execution
(4) Assessment

Time Sensitive Targets (TST)

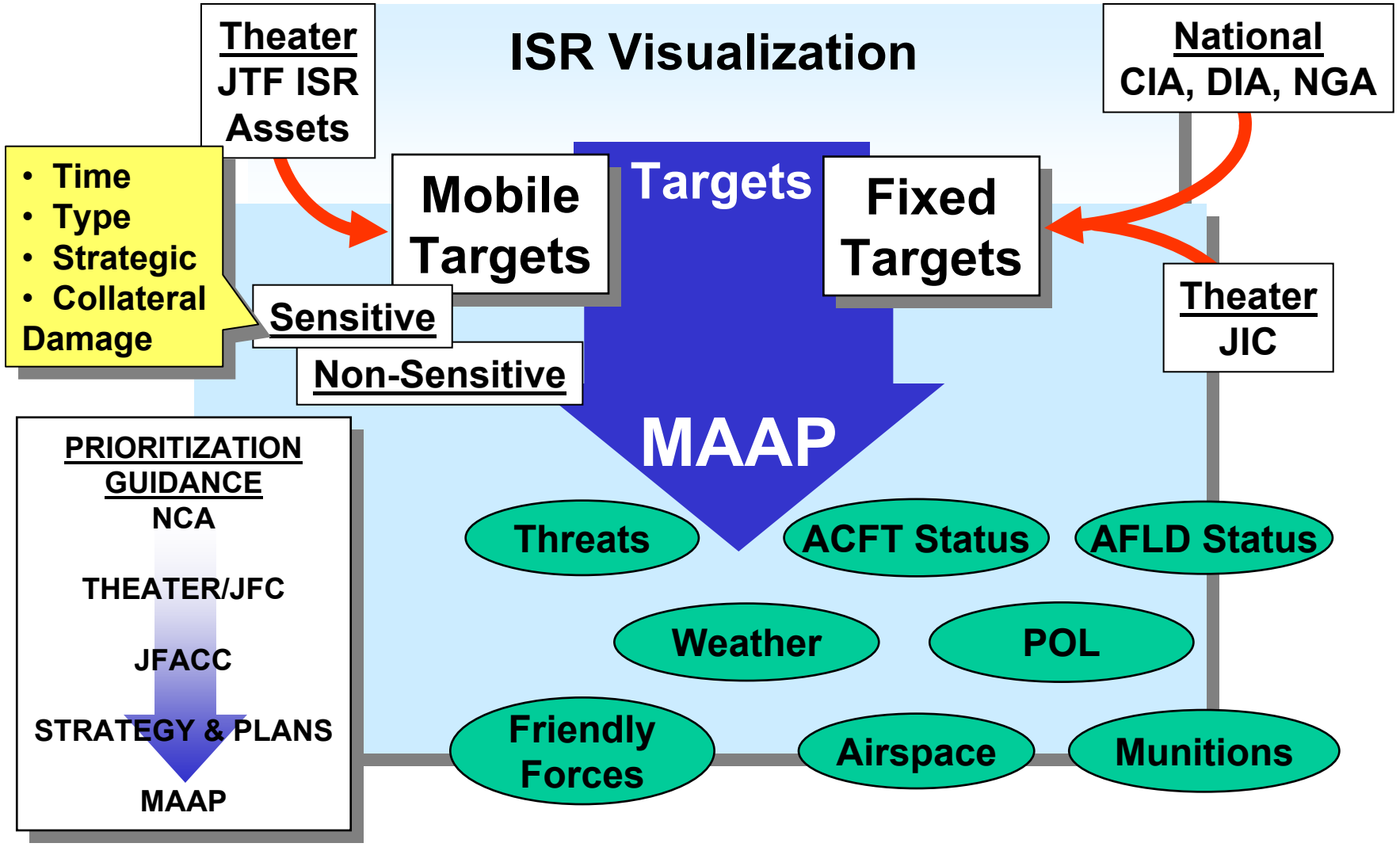
Joint Integrated Prioritized Target List (JIPTL)

ISR Collection Plan

Problems Remedied:
- ISR becomes postured to support EBO
- ISR anticipatory, not reactive
- ISR remains synchronous *and* asynchronous with operations

Drive the Adversary to the Commander's desired COA

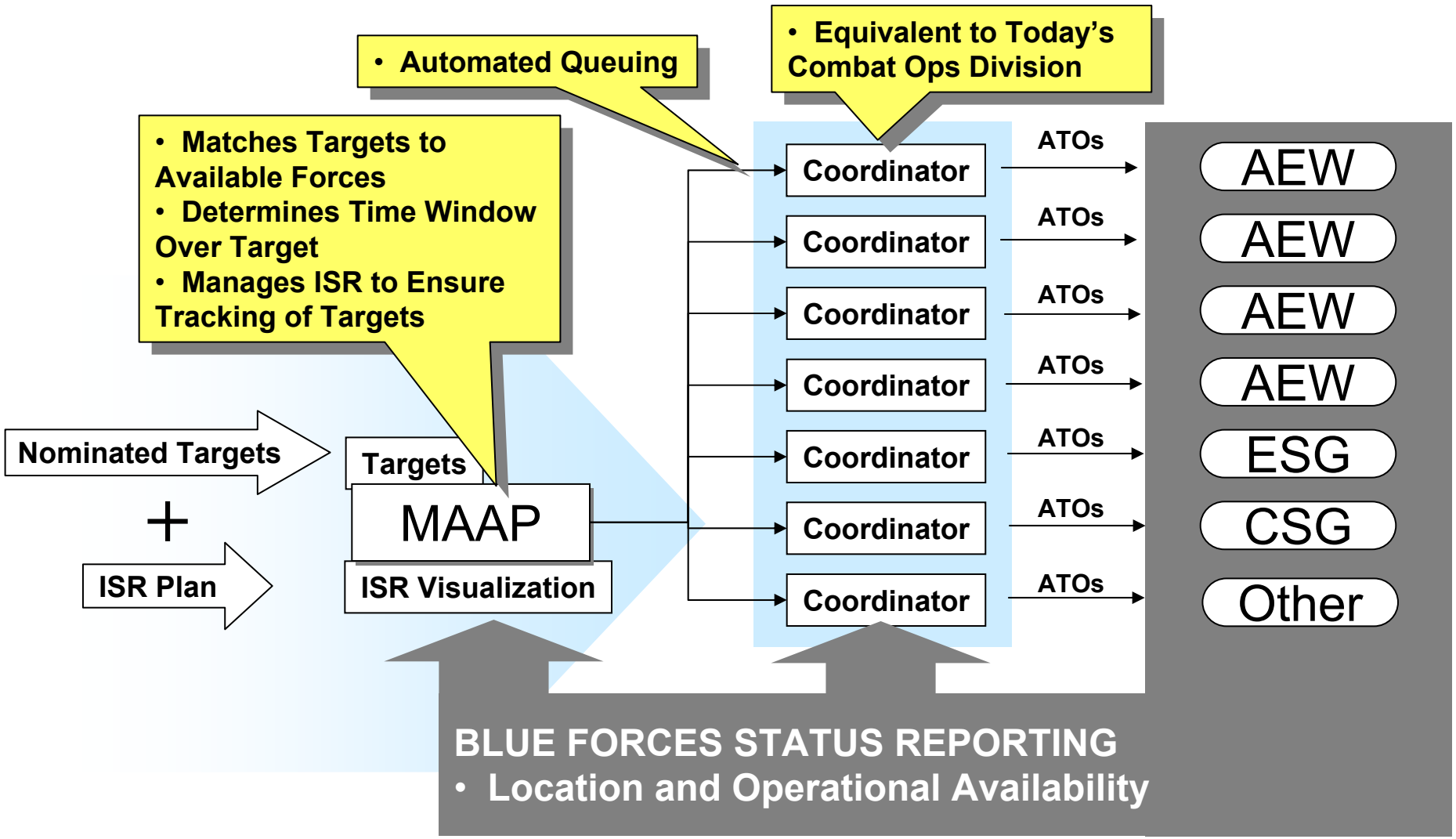
Master Air Attack Planning



Master Air Attack Plan

Per Joint Publication 3-30, *Command and Control for Joint Air Operations*, Figure III-14

The MAAP Feeds a Stream of ATOs to Force Capabilities

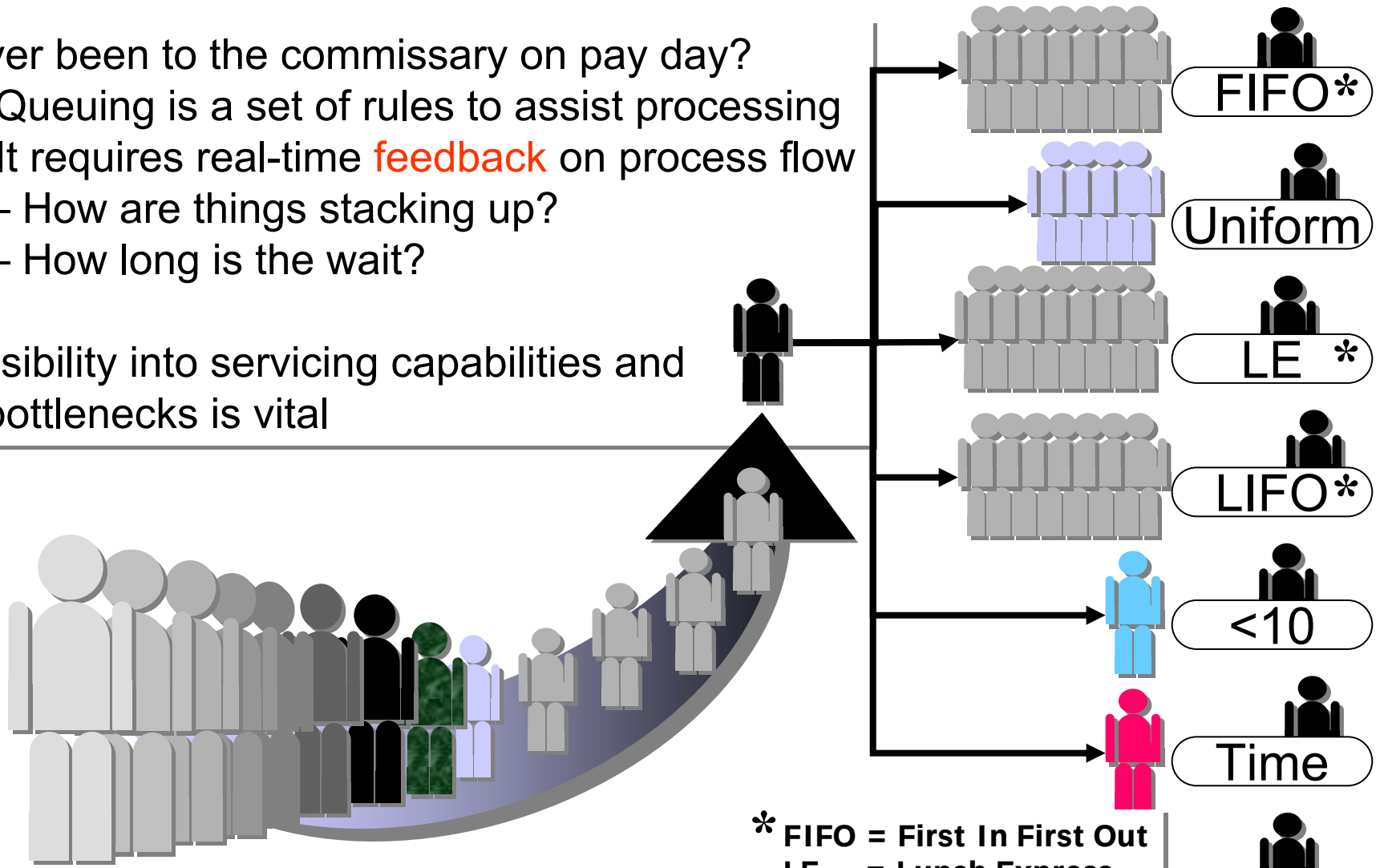


How Does Queuing Work?

Ever been to the commissary on pay day?

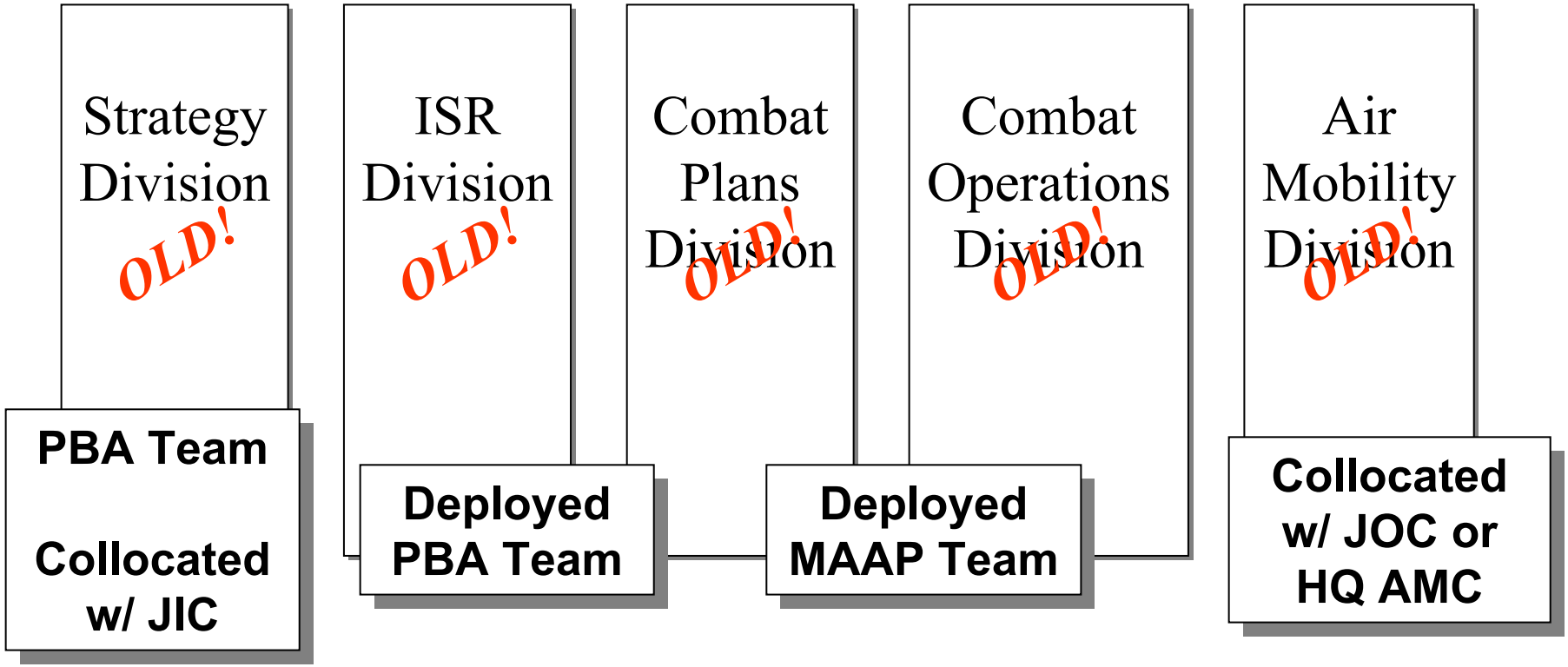
- Queuing is a set of rules to assist processing
- It requires real-time feedback on process flow
  - How are things stacking up?
  - How long is the wait?

Visibility into servicing capabilities and bottlenecks is vital



* FIFO = First In First Out
LE = Lunch Express
LIFO = Last In First Out
Time = Processing Time

Changes to the AOC Structure



The Deployed AOC is a Decision Node

Conclusion

- Establishing this construct facilitates oncoming improvements in weapons and C4ISR
  - Creates a modular production process, enhancing flexibility
  - Easier to “plug-and-play” new capabilities
- Reduce the time and labor to produce and manage the ATO
  - AOCs are “ATO factories”
  - Factories consolidate resources (footprint), i.e., people, comms, equipment, to mass produce products
  - We no longer have to operate our “factory” like Henry Ford—it’s time to optimize production
- Take the human out of the labor but keep the human in the decision cycle

How to Reach Us

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